



UNITED STATES DEPARTMENT OF COMMERCE  
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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00/475,000 00/07/00 REDRONE 70897-0700

IBM CORPORATION  
INTELLECTUAL PROPERTY LAW  
P O BOX 218  
YONKOWN HEIGHTS NY 10598

1051/0700

EXAMINER

00 000TY.D

ART UNIT

PAPER NUMBER

1751

20

DATE MAILED:

07/00/90

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.  
08/479,810

Applicant(s)  
Bednorz et al.

Examiner  
Douglas J. McGinty

Group Art Unit  
1751



☒ Responsive to communication(s) filed on 5-14-98, 5-1-98, and 12-2-97

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claim

☒ Claim(s) 1-129 is/are pending in the application 104-108, 110, 117, 118, 121, 122, 125-129  
Of the above, claim(s) 2-11, 32, 39, 47-54, 60-63, 65-68, 73-76, 82, 83, 87-90, 97-102 is/are withdrawn from consideration

☒ Claim(s) 123 is/are allowed.

☒ Claim(s) 1, 12-31, 33-38, 40-46, 55-59, 64, 69-72, 77-81, 84-86, 91-96, 103, 109, 111-116 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☒ All ☐ Some\* ☒ None of the CERTIFIED copies of the priority documents have been  
☐ received.

☒ received in Application No. (Series Code/Serial Number) 08/053,307.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

### DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action. The rejections and objections, if any, from the previous Office Action have been withdrawn if not repeated in this Office Action.
2. It is requested that this Examiner be notified of all pending, related applications.<sup>1</sup> That notice need not be in a PTO form - 1449, however.<sup>2</sup>

#### *Status of the Claims*

3. Claims 1-129 are pending.
  - a. The applicant previously elected Group I, claims 1, 12-31, 33-38, 40-46, 55-59, 64, 69-72, 77-81, 84-86, 91-96, and 103 in paper no. 13, filed May 12, 1997.
  - b. Newly added claims 109, 111-116, 119, 120, 123, and 124 also fall within Group I and therefore are examined at this time.
  - c. Newly added claims 110, 117, 118, 121, 122, and 125-129 apparently<sup>3</sup> fall within Group II and therefore are withdrawn from further consideration.

#### *Priority*

4. Acknowledgment is made of applicant's claim for priority under 35 U.S.C. § 119 in their paper filed May 1, 1998. The certified copy has been filed in parent application, Serial No. 08/053,307, filed on April 23, 1993 as paper no. 28.
  - a. However, a review of that certified copy, which is in English, indicates that it does not support the present assertion of priority. Support is not found in that certified copy for the invention as presently claimed. See MPEP 201.13 et seq. and 201.14 et seq.

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<sup>1</sup> See MPEP 2001.06(b).

<sup>2</sup> See MPEP 901.03.

<sup>3</sup> To the extent these claims are understood they "apparently" fall within Group II. The term "structure" appears to only involve a composition. The term "invention" also fails to specify the statutory class of invention, with only a recitation of a composition. In light of the claim language as a whole, therefore, these claims are deemed to fall within Group II as directed only to compositions.

b. Applicants' arguments filed May 14, 1998 (paper no. 19), May 1, 1998 (paper no. 18.5), and December 2, 1997 (paper no. 16), as well as the Affidavits and Attachments, have been fully considered but they are not deemed to be persuasive. The applicants quote some passages out of the priority document and argue that the present claims are fully based that document. Nevertheless, that priority document is not deemed to provide basis for the limitations found in the present claims. For instance:

i. The recitation of a "composition including a rare earth or rare earth-like element, a transition metal element capable of exhibiting multivalent states and oxygen", as found in claim 1 (lines 2-4). The certified priority document may provide basis for the formula  $\text{RE}_2\text{TM.O}_4$  at p. 2, para. 4, but the claimed composition is deemed to be much broader than that formula.

ii. The limitation "non-stoichiometric amount of oxygen", as found in claims 84 (lines 2 and 3) and 86 (line 6). Basis may be seen for an oxygen deficit at p. 2, para. 4, but no such basis is seen for the more general limitation of "a nonstoichiometric amount of oxygen".

iii. The limitation "a transition metal oxide having a phase therein which exhibits a superconductive state" is found in present claim 24, line 2. The certified priority document may provide basis for compositions of the formula  $\text{RE}_2\text{TM.O}_4$ , as discussed above, but "transition metal oxide" and "superconductive state" are deemed to be much broader than the formula  $\text{RE}_2\text{TM.O}_4$ .

iv. The limitation "a copper-oxide compound" is recited in claim 96 at line 4. The certified priority document may provide basis for compositions of the formula  $\text{RE}_2\text{TM.O}_4$ , as discussed above, but "a copper-oxide compound" is not deemed to be equivalent to a composition of the formula  $\text{RE}_2\text{TM.O}_4$ . Basis is not seen in the certified priority document for "a copper-oxide compound" with the breadth of the present claims.

v. The limitation to the effect that "the copper oxide compound includes (including) at least one rare-earth or rare-earth-like element and at least one alkaline-earth element", as recited in claim 103 (lines 5 and 6). The certified priority document may provide basis for compositions of the formula  $\text{RE}_2\text{TM.O}_4$ , as discussed above, but basis is not seen for the

more general limitation of "a copper-oxide compound" with a rare-earth (like) element and an alkaline earth element.

vi. The limitation as to "the effectively-zero-bulk-resistivity intercept temperature  $T_{p=0}$ ", as found in claim 103 (lines 10 and 13). The critical temperature,  $T_c$ , is discussed throughout that certified priority document, but not  $T_{p=0}$ .

c. Applicants' arguments filed May 14, 1998 (paper no. 19), May 1, 1998 (paper no. 18.5), and December 2, 1997 (paper no. 16), as well as the Affidavits and Attachments, have been fully considered but not found to be persuasive. This issue has been fully discussed at section 4 of the June 25, 1998 Office Action, paper no. 66, in 08/303,561, the discussion which is incorporated herein by reference.

***Claim Rejections - 35 USC § 112***

5. The specification is objected to under 35 U.S.C. § 112, *first paragraph*, as failing to provide an enabling disclosure commensurate with the scope of the claims.

☆ { a. The present specification is deemed to be enabled only for compositions comprising  $Ba_xLa_{5-x}Cu_5O_y$ . The art of high temperature (above 30°K) superconductors is an extremely unpredictable one. Small changes in composition can result in dramatic changes in or loss of superconducting properties. The amount and type of examples necessary to support broad claims increases as the predictability of the art decreases.<sup>4</sup> Claims broad enough to cover a large number of compositions that do not exhibit the desired properties fail to satisfy the requirements of 35 USC 112.<sup>5</sup> Merely reciting a desired result does not overcome this failure.<sup>6</sup> In particular, the question arises: Will any layered perovskite material containing copper exhibit

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<sup>4</sup>See In re Fisher, 166 USPQ 18, 24; and In re Angstadt and Griffen, 190 USPQ 214, 218. See also, In re Colianni, 195 USPQ 150, 153, 154 (CCPA 1977) (J. Rich).

<sup>5</sup>See In re Cook, 169 USPQ 298, 302; and Cosden Oil v. American Hoechst, 214 USPQ 244, 262.

<sup>6</sup>See In re Corkill, 226 USPQ 105, 1009.

superconductivity? Also, does any stoichiometric combination of rare earth, an alkaline earth, and copper elements result in an oxide superconductor?

b. It should be noted that at the time the invention was made, the theoretical mechanism of superconductivity in these materials was not well understood. That mechanism still is not understood. Accordingly, there appears to be little factual or theoretical basis for extending the scope of the claims much beyond the proportions and materials actually demonstrated to exhibit high temperature superconductivity. A "patent is not a hunting license. It is not a reward for the search, but a reward for its successful conclusion".<sup>7</sup>

c. **Claims 1, 12-31, 33-38, 40-46, 55-59, 64, 69-72, 84-86, 91-96, 109, 111, 112, 115, 116, 119, and 120 are rejected under 35 U.S.C. § 112, *first paragraph*, for the reasons set forth in the objection to the specification.**

d. Applicants' arguments filed May 14, 1998, May 1, 1998, and December 2, 1997, paper nos. 19, 18.5, and 16, as well as the Affidavits filed May 14, 1998, paper no. 18, and the Attachments, have been fully considered but not found to be persuasive.

i. The additional caselaw and arguments by the applicants have been duly noted. For the reasons that follow, however, the record as a whole is deemed to support the initial determination that the originally filed disclosure would not have enabled one skilled in the art to make and use the invention to the scope that it is presently claimed.

ii. The applicants quote several passages from their specification at pp.12-15 of their December 2, 1997 Amendment, but the issue is the scope of enablement, not support. The present disclosure may or may not provide support for particular embodiments, but the issue here is the scope to which that disclosure would have taught one skilled in the art how to make and use a composition which shows the onset of superconductivity at above 26°K.

iii. Construed in light of that issue, the invention is not deemed to have been fully enabled by the disclosure to the extent presently claimed.

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<sup>7</sup>See Brenner v. Manson, 383 US 519, 148 USPQ 689.

(1) In their December 2, 1997 Amendment, the applicants appear to argue that their disclosure refers to the composition represented by the formula RE-TM-O, where RE is a rare earth or rare earth-like element, TM is a nonmagnetic transition metal, and O is oxygen, and list several species such as " $\text{La}_{2-x}\text{Ba}_x\text{CuO}_{4-y}$ " which they indicate are found in the present disclosure.

(2) Notwithstanding that argument, it still does not follow that the invention is fully enabled for the **scope** presently claimed. The claims include formulae which are much broader than the RE-TM-O formula cited in the disclosure.

(a) The present specification actually shows that known forms of "a transition metal oxide", "a composition", and "a copper-oxide compound" do **not** show the onset of superconductivity at above 26°K. At p. 3, line 20, through p. 4, line 9, of their disclosure, the applicants state that the prior art includes a "Li-Ti-O system with superconducting onsets as high as 13.7°K." Official Notice is taken of the well-known fact that Ti is a transition metal. That disclosure also refers to "a second, non-conducting CuO phase" at p. 14, line 18.

(b) Accordingly, the present disclosure is not deemed to have been fully enabling with respect to the "transition metal oxide", "composition", or "copper-oxide compound".

(3) The examples at p. 18, lines 1-20, of the present specification further substantiates the finding that the invention is not fully enabled for the scope presently claimed.

(a) With a 1:1 ratio of (Ba, La) to Cu and an x value of 0.02, the La-Ba-Cu-O form (i.e., "RE-AE-TM-O", per p. 8, line 11) shows "no superconductivity".

(b) With a 2:1 ratio of (Ba, La) to Cu and an x value of 0.15, the La-Ba-Cu-O form shows an onset of superconductivity at " $T_c = 26^\circ\text{K}$ ". It should be noted, however, that **all** of the claims in this application require the critical temperature ( $T_c$ ) to be "in excess of 26°K" or "greater than 26°K".

(c) Consequently, the present disclosure is not deemed to adequately enable the full scope of the present claims. Independent claims 86 and 103 may

require the presence of rare earth, alkaline earth, and transition metals, but the aforementioned examples show that superconductivity is still very unpredictable. Those claims cannot be deemed to be fully enabled.

iv. The applicants also have submitted three affidavits attesting to the applicants' status as the discoverers of materials that superconduct  $> 26^{\circ}\text{K}$ . Each of the affidavits further states that "all the high temperature superconductors which have been developed based on the work of Bednorz and Muller behave in a similar manner (way)". Each of the affidavits add "(t)hat once a person of skill in the art knows of a specific transition metal oxide composition which is superconducting above  $26^{\circ}\text{K}$ , such a person of skill in the art, using the techniques described in the (present) application, which includes all known principles of ceramic fabrication, can make the transition metal oxide compositions encompassed by (the present) claims ...without undue experimentation or without requiring ingenuity beyond that expected of a person of skill in the art." All three affiants apparently are the employees of the assignee of the present application.

(1) Those affidavits do not set forth particular facts to support the conclusions that all superconductors based on the applicants' work behave in the same way and that one skilled in the art can make those superconductors without undue experimentation. Conclusory statements in an affidavit or specification do not provide the factual evidence needed for patentability.<sup>8</sup>

(2) Those affidavits do not overcome the non-enablement rejection. The present specification discloses *on its face* that only certain oxide compositions of rare earth, alkaline earth, and transition metals made according to certain steps will superconduct at  $> 26^{\circ}\text{K}$ .

(3) Those affidavits are not deemed to shed light on the state of the art and enablement *at the time* the invention was made. One may know *now* of a material that superconducts at more than  $26^{\circ}\text{K}$ , but the affidavits do not establish the existence of that knowledge on the filing date for the present application. Even if the present application "includes all known principles of ceramic fabrication", those affidavits do not establish the level of skill in

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<sup>8</sup>See In re Lindner, 173 USPQ 356, 358 (CCPA 1972).

the ceramic art as of the filing date of that application. Moreover, that additional indication is considered to be a conclusory statement unsupported by particular evidence.

(4) It is fully understood that the applicants are the pioneers in high temperature metal oxide superconductivity. The finding remains, nonetheless, that the disclosure is not fully enabling for the scope of the present claims.

v. The applicants argue that the "standard of enablement for an apparatus or device is not the same as the standard of enablement for a composition of matter" and that their claimed invention is enabling because it is directed to an apparatus rather than a composition. Basis is not seen for that argument, to the extent that it is understood. It is noted that 35 USC 112, first paragraph, reads as follows:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Apparatus or device claims also would be subject to the statutory provisions of 35 USC 112, first paragraph.

vi. The applicants assert that the "Examiner has not shown by evidence not contained within applicants' teaching that the art of high  $T_c$  superconductors is unpredictable in view of applicants' teaching" (spelling and punctuation errors corrected). To the extent that the same assertion is understood, the rejection is maintained for the reasons of record.

vii. The applicants point to "Copper Oxide Superconductors" by Charles P. Poole, Jr., et al., (hereinafter, "the Poole article") as supporting their position that higher temperature superconductors were not that difficult to make after their original discovery.

(1) Initially, however, it should be noted that the Poole article was published *after* the priority date presently claimed. As such, it does not provide evidence of the state of the art *at the time* the presently claimed invention was made.

(2) Moreover, the present claims are directed to metal oxide superconductors devices, **not** processes of making them. Even if the Poole article provided direct evidence of the state of the art at the time the invention was made, which it apparently does not, that evidence still does not pertain to the issue at hand, namely, an apparatus for using metal oxide superconductors to conduct electricity under superconducting conditions.

(3) Finally, the Preface states in part at A3: "The unprecedented worldwide effort in superconductivity research that has taken place over the past two years has produced an enormous amount of experimental data on the properties of the copper oxide type materials that exhibit superconductivity above the temperature of liquid nitrogen. ... During this period a consistent experimental description of many of the properties of the principal superconducting compounds such as BiSrCaCuO, LaSrCuO, TlBaCaCuO, and YBaCuO has emerged. ... The field of high-temperature superconductivity is still evolving ..." That preface is deemed to show that the field of high-temperature superconductivity continued to grow, on the basis of on-going basic research, *after* the Bednorz and Meuller article was published.

viii. This Office Action is deemed to be a complete discussion of all relevant issues raised by the applicants.

**6. Claims 115, 116, 119, 120, and 124 are rejected under 35 U.S.C. 112, *first* paragraph, as based on a disclosure which is not enabling.**

a. Each of claims 115, 116, 119, 120, and 124 provide for a superconductor "having a  $T_c$  greater than 26°K", but those claims do not provide for a step of -- maintaining said (superconductor) at a temperature less than said  $T_c$  --.

b. Those claims are not enabled because they lack the critical step of maintaining the appropriate temperature for superconductivity.<sup>9</sup>

**7. Claims 1, 17, 19, 20-23, 27-31, 33, 36-38, 40-45, 55, 56, 58, 59, 64, 72, 77-81, 86, 93-96, 103, and 111 are rejected under 35 U.S.C. § 112, *second paragraph*, as being indefinite**

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<sup>9</sup>See In re Mayhew, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

**for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

a. Claim 1, lines 2 and 3, is unclear with the term "rare earth-like element". The terms "type" and "like" are unclear.<sup>10</sup> It is suggested that the same term be changed to -- or Group IIIB element --.

b. Claim 17 is unclear with the term "rare earth-like element".

c. Claim 19 is unclear with the term "perovskite-like superconducting phase".

d. Claims 20-23 are unclear with the term "substituted transition metal oxide". That terminology is unclear as to what is the substitute for Cu-oxide and as to how much substitution occurs.

e. Claim 27 has the terminology "substituted Cu-oxide" but that terminology is unclear as to what is the substitute for Cu-oxide and as to how much substitution occurs.

f. Claim 27 has the language "said composition being a substituted Cu-oxide including a superconducting phase having a structure substantially close to the orthorhombic-tetragonal phase transition of said composition". That language is found to be indefinite because it is unclear how close is "substantially close". Relative terminology in a claim is indefinite when one of ordinary skill in the art would not be apprised of the scope of the claim.<sup>11</sup> In this case, one skilled in the art would not be able to determine whether the superconducting phase is physically close to the orthorhombic-tetragonal phase transition or whether that phase is "like" that transition.

g. Claim 28 is unclear with the language "rare earth-like".

h. Claim 29 is unclear with the language "substituted Cu-oxide".

i. Claim 30 is indefinite with the limitation that "said alkaline earth element is atomically large with respect to Cu". That limitation is unclear as to how the alkaline earth

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<sup>10</sup>See MPEP 2173.05 (b), part (e).

<sup>11</sup>See 2173.05 (b).

element is "large", i.e., whether size is measured according to covalent radius, metallic radius, or atomic volume. The term "large" also is unclear as to how large is "large".<sup>12</sup>

j. Claim 33 is unclear as to whether the alkaline earth element is concentrated "near" to the copper oxide concentration or whether the degree of alkaline earth element concentration is "near" to the amount of copper oxide concentration. If the latter is the case, then it is unclear if the degree of concentration is in molar or weight percentages.

k. Claim 33 is unclear as to the "superconducting copper oxide phase" changes into the tetragonal structural phase or whether that "superconducting copper oxide phase" is found in a composition at the boundary between orthorhombic and tetragonal phases.

l. Claim 36 is unclear with the language "substituted copper oxide".

m. Claim 40 is unclear with the language "said superconductor being comprised of at least four elements, none of which is itself superconducting". Included with this Office Action are pp. E-84 and E-85 of the Handbook of Chemistry and Physics (82-83), which show that rare earth and IIIB metals (La, Ce, Lu) will superconduct, as well as a IIA metal (Ba).

n. Claim 42 is unclear because the term "doped transition metal oxide" does not indicate what the dopant is.

o. Claim 43 is indefinite with the requirement that the "doped transition metal oxide is multivalent". A metallic element may be "multivalent" but it is unclear how an oxide may be "multivalent" as well.

p. Claim 55 is indefinite with the language "said transition metal being non-superconducting ... and said oxide having multivalent states". Presumably the transition metal is superconducting when in the appropriate oxide form. Also, the oxide itself does not have "multivalent states", while the metallic elements may.

q. Claim 58 is unclear with the term "layer-like structure".

r. Claim 59 is unclear with the term "ceramic-like".

s. Claim 64 is indefinite.

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<sup>12</sup>See MPEP 2173.05(b), subpart (f).

i. The term "mixed copper oxide" is unclear as to whether metals other than copper must be present.

ii. The term "element" is unclear as to whether it involves an element other than copper and oxide.

iii. The language "distorted octahedral oxygen environment" is unclear as to what the "environment" is or how it is related to the composition.

t. Claim 72 is unclear with the term "rare earth-like element".

u. Claim 77 is unclear with the terms "rare earth-like element" and "layer-like crystalline structure".

v. Claim 80 is unclear with the term "perovskite-like".

w. Claim 86 is unclear with the term "rare earth-like" element.

x. Claim 93 is indefinite. That claim is unclear with the term "mixed copper oxide" because it does not indicate with what the copper oxide is "mixed".

y. Claim 94 is unclear with the term "layer-like".

z. Claim 95 is unclear with the requirement that "said copper oxide material exhibits a mixed valence state". The copper element, not the oxide material, exhibits that "mixed valence state".

aa. Claim 96 has the language "the superconductive composition consisting essentially of a copper-oxide compound having a layer-type perovskite-like crystal structure".

i. The terms "type" and "like" are unclear.

ii. That language also is unclear as to whether other elements must be present as well.

bb. Claim 103 is unclear with the terms "layer-type", "perovskite-type", and "rare-earth-like".

cc. Claim 111, last line, is unclear with the term "superconducting".

8. Applicants' arguments filed May 14, 1998, May 1, 1998, and December 2, 1997, paper nos. 19, 18.5, and 16, as well as the Affidavits filed May 14, 1998, paper no. 18, and the Attachments, have been fully considered but not found to be persuasive.

a. The applicants argue that the terms "rare-earth like", "perovskite-like", and "perovskite-type" are definite. Those arguments are not found to be persuasive.

i. The applicants point to Attachments A-D, L, and M with LEXIS<sup>TM</sup> searches which supposedly show that the terms "rare-earth like", "perovskite-like", "perovskite-type", "layer-like", and "ceramic-like" found in various US patents. That evidence is not considered to be persuasive. Each patent application is considered on its own merits. In some contexts it may have been clear in the art to use the term "like", such as when the "like" term is sufficiently defined. In the present case, however, the terms "rare-earth like" and "perovskite-like" are unclear. As suggested above, "rare-earth like" should be changed to -- rare earth or Group IIIB element --. The terms "like" or "type" also should be removed from "perovskite-like" or "perovskite-type".

ii. The applicants further point to Attachments E and F, but those attachments are not considered to be persuasive. Both were published *after* the priority date afforded to the presently claimed invention and therefore does not reflect on the knowledge of one skilled in the art at the time the invention was made. Those articles also apparently do not reflect on the degree of precision required for patent claims. The crystalline structure itself should be identified as -- perovskite --.

b. The applicants argue that limitations directed to "substituted", "doped", or "mixed" copper or metal oxides are definite. In support of that argument, the applicants mention Attachments G, K, and O, but those attachments appear to have been published *after* the priority date afforded to the presently claimed invention and therefore does not reflect on the knowledge of one skilled in the art at the time the invention was made. Regardless of what else is found in the Poole et al. source, moreover, the question still remains: Substituted with what and with how much?

c. The applicants assert that the other terminology discussed above is definite, but those assertions are not found to be persuasive for the reasons that follow. It is suggested that the claims be rewritten to comport with the basic rules of standard patent practice.

i. The language "said composition being a substituted Cu-oxide including a superconducting phase having a structure substantially close to the orthorhombic-tetragonal phase transition of said composition" is still unclear as to whether "close" means physically "close" or structurally similar.

ii. The language "said alkaline earth element is atomically large with respect to Cu" still is unclear as to how the radius is measured and the degree of largeness.

iii. Claim 33 still is unclear as to whether the alkaline earth element is concentrated "near" to the copper oxide concentration or whether the degree of alkaline earth element concentration is "near" to the amount of copper oxide concentration. If the latter is the case, then it is unclear if the degree of concentration is in molar or weight percentages. The applicants purportedly "do not understand" this rejection, but the point remains that it is unclear whether "near" refers to spatial distance or relative amounts.

iv. Claim 33 also still is unclear as to the "superconducting copper oxide phase" changes into the tetragonal structural phase or whether that "superconducting copper oxide phase" is found in a composition at the boundary between orthorhombic and tetragonal phases. The applicants purportedly "do not understand" this rejection, but the point remains that it is unclear how the composition "undergoes .... (a) phase transition".

v. It still is unclear to refer to metal oxide as being "multivalent" or as having "multivalent states". The claims involved should be rewritten to more clearly set forth the fact that the metal, not the oxide, is multivalent or has multivalent states.

vi. Claim 64 still is indefinite because the term "element" is unclear as to whether it involves an element other than copper and oxide. Both copper and oxygen are "elements".

vii. The language "distorted octahedral oxygen environment" also still is unclear as to what the "environment" is or how it is related to the composition. The applicants point to Attachment P which was published *after* the priority date afforded to the presently claimed invention and therefore does not reflect on the knowledge of one skilled in the art at the

time the invention was made. Moreover, the term "environment" is unclear as to whether or not it is a crystalline lattice.

viii. Further with respect to claim 96, that claim still is unclear as to whether the "copper-oxide compound having a layer-type perovskite-like crystal structure" contains elements other than copper and oxygen. It is noted, moreover, that perovskite has the general formula  $ABO_3$ , wherein A and B represent metal atoms.

d. This Office Action is deemed to be a complete discussion of all relevant issues raised by the applicants, in view of all the affidavits and attachments in the record.

***Claim Rejections - 35 USC § 103***

9. Claims 1, 12-31, 33-38, 40-46, 55-59, 64, 69-72, 77-81, 84-86, 91-96, 103, 109, 111-116, 119, 120, and 124 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Asahi Shinbum, International Satellite Edition (London), November 11, 1986 (hereinafter, "the Asahi Shinbum article").

a. The scope and contents of the prior art are determined as follows:

i. As discussed in paper no. 20 of the ancestral application, 07/053,307, it is not fully clear to what exact date applicants are entitled. Based on the record, nonetheless, that date would appear to be no later than around December 13, 1986, the date samples were tested in the US to show superconductivity.<sup>13</sup> The Asahi Shinbum article was published on November 28, 1986.

ii. The reference confirms superconductivity in an oxide compound of La and Cu with Ba having a structure of the so-called perovskite structure.

b. The differences between the prior art and the claims at issue are ascertained as follows:

i. Although the reference may not teach use of the testing of zero resistance for confirming superconductivity, it *prima facie* must have been used because it is one of two methods used for testing for superconductivity (the other being diamagnetism). Accordingly, the burden of proof is upon the applicants to show that the instantly claimed subject matter is different from and unobvious over that taught by this reference.<sup>14</sup>

ii. The reference may not specifically teach a means of cooling the composition to a temperature at or below the onset of superconductivity and the means for passing an electrical current through that composition under superconducting conditions. Nevertheless, the reference did teach testing at temperatures of up to 30°K. Since temperatures on the Earth's surface are much greater than 30°K, it would have been obvious to use a cooling

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<sup>13</sup>See MPEP 715 et seq.

<sup>14</sup>See In re Brown, 173 USPQ 685, 688; In re Best, 195 USPQ 430; and In re Marosi, 218 USPQ 289, 293.

means to attain that colder temperature. Moreover, the reference discusses superconductivity, which connotes the passing of electricity through an object under superconducting conditions. Passing electricity under those conditions also would have been obvious because the reference discusses certain applications, such as very strong magnets, NMR machines, linear motorcars, electricity transport systems, etc.

iii. The reference also may not specifically teach orthorhombic-tetragonal phase transitions, doping, mixed valence states, non-stoichiometric oxygen, layered perovskite crystalline structures, electron-phonon interactions, substituted copper oxide,  $\text{Cu}^{3+}$  ions, ceramic materials, enhanced polaron formation, distorted octahedral oxygen environment, or distorted orthorhombic crystalline structure. Nevertheless, the reference is deemed to teach the claimed composition; the applicant or applicants need to show that his, her, or their invention is actually different from and unexpectedly better than the prior art.<sup>15</sup>

c. The level of ordinary skill in the relevant art is resolved with the finding that, based on the teachings of the Asahi Shinbum article as a whole, it would have been obvious to one of such skill because that reference teaches superconductivity in an oxide compound of La and Cu with Ba having a structure of the so-called perovskite structure.

d. Applicants' arguments filed May 14, 1998, May 1, 1998, and December 2, 1997, paper nos. 19, 18.5, and 16, as well as the Affidavits filed May 14, 1998, paper no. 18, and Attachments have been fully considered but not found to be persuasive. The applicants argue that the reference is not a proper reference because it was essentially their own work, they were entitled to a one year grace period, and the evidence shows that they introduced the invention in the United States prior to the publication date of the reference. Those arguments have been fully discussed in the ancestral applications, including the Office Actions in 08/303,561. The reference is found to be prior art because it was the work of another before the earliest priority date for the presently claimed invention. The one year grace period applies to prior art under 35 USC 102(b),

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<sup>15</sup>See In re Best, 195 USPQ 430, 433, 434 (CCPA 1977).

whereas the reference is prior art in this case under 35 USC 102(a). The record also does not establish an early enough reduction to practice in this country.

***Possibly Allowable Subject Matter***

10. It is noted that the applicants were awarded the Nobel Prize for their work in this area. The record is not deemed to indicate, however, that the Asahi Shinbum article was predicated by the applicants' earlier conception and/or reduction to practice *in this country*. The presently claimed invention also is non-enabling and indefinite for the reasons set forth above.

11. To overcome the above rejections, it is suggested that claims 1-122 and 124 be canceled.

12. The following is an Examiner's statement of reasons for the indication of possibly allowable subject matter:

a. The Asahi Shinbum article teaches in general that perovskite-like compounds of La, Cu, and Ba have a  $T_c$  of 30°K, but that article apparently does not teach apparatuses with the particular formula in the amendment suggested above. The examples in the present specification are deemed to show criticality for that formula in that suggested amendment.

b. Support for the proposed amendment is found at p. 20, line 1, through p. 25, line 5, and in Figure 3.

c. This indication of possibly allowable subject matter is subject to further consideration and review.

***Conclusion***

13. **THIS ACTION IS MADE FINAL.** The new grounds of rejection, if any, were necessitated by an Amendment.<sup>16</sup> Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE

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<sup>16</sup>See MPEP 706.07(a).

ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

14. The following website may be consulted for general information: <http://www.uspto.gov/>

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas J. McGinty, whose telephone number is (703) 308-3805. The examiner normally can be reached on Monday through Friday from 8:30 A.M. to 5:00 P.M., Eastern time. If *reasonable* attempts to reach the examiner by telephone are unsuccessful, however, the examiner's supervisor, Mr. Paul Lieberman, can be reached at (703) 308-2523. Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center receptionist whose telephone number is (703) 308-0661. The fax number for this Technology Center is (703) 305-7718.

July 29, 1998  
479810.4

  
**Douglas J. McGinty**  
**Primary Examiner**  
**Group 1700**